CLAIMS

1. A proximity detector for use in a mobile telephone apparatus, said phone comprising at least a microphone (1) and a loudspeaker (5) operatively connected to signal processing means (2,3,4), **characterized** by data processing and control means (6) including means for controlling the signal processing means (3,4) in order to activate said loudspeaker for reproducing an acoustic control signal, correlating means for correlating the control signal received directly (D_{direct}) by the microphone (1) and the control signal being reflected (D_1+D_2) from a user (13) of the phone (9) and then received by the microphone (1) for determining the distance ($D_1 \approx D_2$) between the phone (9) and the user (13), and signal level control means for controlling the signal processing means (3,4) in order to varying the signal level of an audible signal reproduced by the loudspeaker (5) proportionally to the determined distance ($D_1 \approx D_2$).

2. A proximity detector according to claim 1, **characterized** in that said data processing and control means (6) including attenuation determining means for determining the attenuation of the control signal being transmitted from the loudspeaker (5) directly to the microphone (1), and means for varying the signal level of an audible signal reproduced by the loudspeaker (5) inversely proportionally to the attenuation.

3. A proximity detector according to any of the preceding claims, **characterized** in that said correlating means includes means for comparing the signal level of the directly transmitted control signal with the signal level of the reflected control signal for determining the distance ($D_1 \approx D_2$) between the phone (9) and the user (13).

4. A proximity detector according to any of the preceding claims, **characterized** in that said correlating means includes means for comparing the signal delay of the directly transmitted control signal with the signal delay of the reflected control signal for determining the distance ($D_1 \approx D_2$) between the phone and the user.

5. A proximity detector for use in a mobile telephone apparatus, said phone comprising at least a microphone (1) and a loudspeaker (5) operatively connected to signal processing means (2,3,4), **characterized** by data processing and control means including means (6) for controlling the signal processing means (3,4) in order to activate said loudspeaker (5) for reproducing an acoustic control signal, attenuation determining means for determining the attenuation of the control signal transmitted directly to the microphone (1), and means for varying the signal level of an audible signal reproduced by the loudspeaker (5) inversely proportionally to the attenuation.

6. A proximity detector according to any of the preceding claims, **characterized** in that said control signal is an ultrasonic signal.

7. A proximity detector according to any of the preceding claims, **characterized** in that said control signal is an audible signal.

8. A proximity detector according to any of the preceding claims, **characterized** in that said control signal is a ring or voice signal.

9. A mobile telephone apparatus, providing sound-based proximity detection, comprising at least a microphone (1) and a loudspeaker (5) operatively connected to signal

processing means (3), **characterized** by a proximity detector according to any of the preceding claims.

10. A method for sound-based proximity detection in a mobile telephone apparatus, said phone comprising at least a microphone (1) and a loudspeaker (5) operatively connected to signal processing means (2,3,4), and data processing and control means (6), **characterized** by the steps of:

said data processing and control means (6) controlling said signal-processing means (3,4) in order to activate said loudspeaker for reproducing an acoustic control signal (200,201),

said data processing and control means (6) receiving first and second control signals from said microphone (1), corresponding to the acoustic control signal received directly from the loudspeaker (5) and the acoustic control signal reflected from a user (13) of the phone (9) and then received, respectively (202),

said data processing and control means (6) correlating said first and second control signals for determining the distance ($D_1 \approx D_2$) between the phone (9) and the user (13)(203,204),

said data processing means and control means (6) generating data control signal for said signal processing means (3,4) in order to activate said loudspeaker (5) for reproducing audible signals with a signal level proportionally to the determined distance between the phone (9) and the user (13)(205).

11. A method according to claim 10, **characterized** by the further steps of:

said data processing means and control means (6) determining the attenuation of the control signal being

transmitted from the loudspeaker (5) directly to the microphone (1)(209),

and varying the signal level of an audible signal reproduced by the loudspeaker (5) inversely proportionally to the attenuation (210).

~~11~~ 12. A method for sound-based proximity detection in a mobile telephone apparatus, said phone comprising at least a microphone (1) and a loudspeaker (5) operatively connected to signal processing means (2,3,4), and data processing and control means (6), **characterized** by the steps of:

said data processing and control means (6) controlling the signal processing means (3,4) in order to activate said loudspeaker (5) for reproducing an acoustic control signal (206,207),

determining the attenuation of the control signal transmitted directly to the microphone (1)(208,209), and

controlling the signal processing means (3,4) in order to varying the signal level of an audible signal reproduced by the loudspeaker (5) inversely proportionally to the attenuation (210).